Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/AU04/001763

International filing date: 15 December 2004 (15.12.2004)

Document type: Certified copy of priority document

Document details: Country/Office: AU
Number: 2004900248
Filing date: 19 January 2004 (19.01.2004)

Date of receipt at the International Bureau: 11 January 2005 (11.01.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)

World Intellectual Property Organization (WIPO) - Geneva, Switzerland
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

PCT/AU2004/001763

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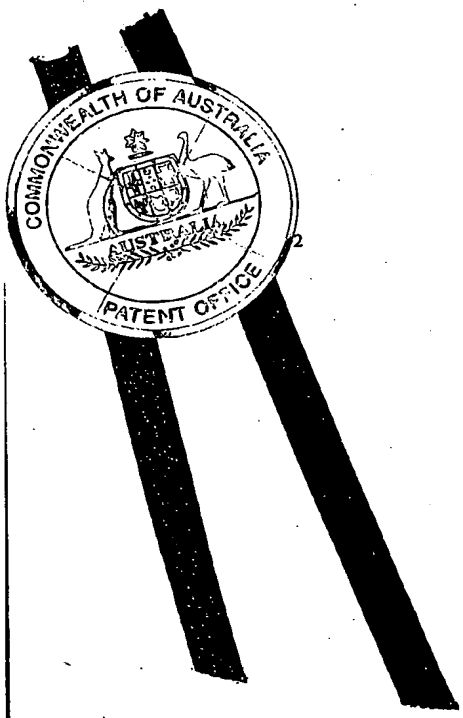

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PROVISIONAL SPECIFICATION

Invention Title: **Method and system for recording search trails across one or more search engines in a communications network**

The invention is described in the following statement:

METHOD AND SYSTEM FOR RECORDING SEARCH TRAILS ACROSS ONE OR MORE SEARCH ENGINES IN A COMMUNICATIONS NETWORK

The present invention relates to a method and system for automatically recording sites accessed by a client in a communications network, and in particular to the recordal of a trail of sites consecutively accessed by the client. The invention is suitable for use in applications in which a client accesses sites from one or more servers forming part of the Internet, and it will be convenient to describe the invention in relation to that exemplary application. It should be appreciated however that the invention is not limited to that application.

Each day millions of searches are conducted on the Internet by using Internet search engines. These search engines are software that search for data based on some criteria. Typically, a user enters a search query and an algorithm is used to determine Hyper Text Markup Language (HTML) documents or other content that match the search query based upon a search algorithm performed by the search engine. Once the search algorithm has been executed, search results consisting of a list of links to a number of relevant HTML documents or other content are returned for display to the client. A user will click on one of the links, and the content located at that link will be served to the client. This content may provide one or more links to other sites, and depending upon their relevance the user may choose to click on one of these further links. In this way, a search trail consisting of a chain of consecutively accessed sites is created by a user.

Current search engines require searchers to rediscover a path to a desired search result each time a new search query is created. Search trails developed by an individual or other users are currently unable to be harnessed to improve the efficiency and relevance of a search conducted on the Internet.

Considerable academic research has been devoted to analysing the behaviour of web searchers. Typically this research relies on web server logs to record web usage data. However, it is impractical to merge user data from multiple servers as this requires cooperation between the server owners. Moreover, server logs only record a limited number of parameters used in Hyper Text Transfer Protocols (HTTP) GET requests, and do not enable meaningful

information to be recorded for constituting a search trail. Recording all page visits by a user in a web server log results in privacy concerns for many users. Furthermore, a web server log is unable to record page visits of a user on third party servers. Recording all page visits also consumes a considerable amount of disk storage space.

Other research into user behaviour whilst browsing the Internet has described the use of HTTP proxies to intercept HTTP requests between a client-side browser and the Internet. Such systems have focused on a user's general web browsing behaviour but have not addressed a user's searching behaviour. A proxy-based solution for recording user browsing behaviour also has a number of important limitations, namely that all requests go via the proxy and excess network bandwidth is consumed, new page requests are transmitted slowly as they must pass via the proxy, and the privacy of the user is not adequately protected since all page requests are intercepted.

It would be desirable to provide an automated method and system for recording sites accessed by a client in a communications network that enables an Internet searcher to record a search and the search trail followed to find a relevant result.

It would also be desirable to enable the recordal of search trails across multiple engines.

It would also be desirable to enable the retrieval of previously generated search trails at a later time, and to enable a searcher to be able to follow search trails previously generated by themselves or other internet searches.

One aspect of the present invention provides an automated method for recording sites accessed by a client in a communications network, the method including the steps of:

detecting submission of a search query from a client to one of a plurality of search engines; and

recording a search trail of one or more parameters of sites accessed consecutively following return of search query results to the client.

The step of detecting submission of the search query may include:

detecting submission of a completed form object from the client; and

determining if part of the form object matches a known search command format of any of the plurality of search engines.

The search command format may include the network address of a search engine program for executing the search query.

The search command format may further include one or more search parameters identifying a user-entered search query.

The step of detecting submission of a completed form object by the client may include:

locating form objects in an object model of content served to a client; and

adding a routine to each form object to enable interception of the completed form object upon submission.

The step of locating all form objects in a document object model of content served to a client is carried out after the content has been served to the client.

The content may be an HTML document, and all form objects in a document object model of the HTML document may be located once a DocumentComplete event occurs.

The HTML document may include a GET or a POST form.

The step of recording one or more parameters of the sites accessed consecutively from the search query results may be optionally selectable at the client once the search query is detected.

The step of recording one or more parameters of the sites accessed consecutively from the search query results may include:

recording the network address of the consecutively accessed sites.

The step of recording one or more parameters of the sites accessed consecutively from the search query results may further include:

recording one or more of a search identifier, network address of a referring site, network address of the client and search term or terms entered by the user at the client.

The step of recording one or more parameters of the sites accessed consecutively from the search query results may further include:

transmitting the one or more parameters identified at the client to a trail recorder server for recordal.

The method may further include the step of initially recording the one or more parameters in a RAM table at the trail recorder server.

The method may further include the step of periodically saving RAM table data to disk-based tables at the trail recorder server.

A first disk-based table may store data characterising its search trail.

A second disk-based table may store data characterising the consecutive sites accessed in each search trail.

The number of consecutively accessed sites may be limited to a predetermined maximum.

The method may further include the step of:

maintaining an adapter table of known search command formats for a plurality of search engines.

The method may further include the step of:

periodically validating the search command formats maintained in the adapter table.

The method may further include the step of:

automatically identifying a search command format of a new search engine; and

updating the adapter table.

The method may further include the step of:

collecting search information identifying a search box page of a search engine; and

identifying the search command format from the search information.

The step of collecting search information may include:

collecting the HTML code of a search box; and

parsing the HTML code to identify the search command format.

The method may further include the step of:

matching the search query to previous search queries to identify related search trails.

The step of matching the search query to previous search queries may include:

conducting a full text search on the search query and previous search queries.

The step of matching the search query to previous search queries may include:

limiting the related search trails to search trails resulting from search queries from a same user.

Alternatively, the related search trails may include search trails resulting from search queries from a same and other users.

The method may further include the step of:

presenting the related search trails at the client.

The step of presenting the related search trails may include:

ordering the related search results by one or more ranking criteria.

The ranking criteria may include any one or more of date, inverse document frequency match, target search engine, user identifier or trail weight indicative of the cumulative frequency of user visits to steps in a related search trail.

Another aspect of the invention provides a system for recording sites accessed by a client in a communications network, the system including:

a search query detector for detecting submission of a search query from the client to one of a plurality of search engines; and

a search trail recorder for recording a search trail of one or more parameters of sites accessed consecutively following return of search query results to the client.

The system may further include:

an adapter manager for maintaining an adapter table of known search command formats for the plurality of search engines.

The system may further include:

a trail searcher for matching the search query to previous search queries to identify related search trails.

Another aspect of the invention provides a search query detector for use with the above described system.

A further aspect of the invention provides a search trail recorder for use with the above described system.

Yet another aspect of the invention provides an adapter manger for use with the above described system.

A still further aspect of the invention provides a trail searcher for use with the above described system.

Further aspects of the invention include computer software including a set of instructions for carrying out the method performed by the search query detector, search trail recorder, adapter manager and/or trail searcher.

The following description refers in more detail to the various features of the present invention. To facilitate an understanding, reference is made in the description to the accompanying drawings where the automated method and system is illustrated in a preferred embodiment. It is to be understood however,

that the invention is not limited to the preferred embodiment as illustrated in the drawings.

Referring now to the drawings;

Figure 1 is a representation of a browser toolbar forming part of a search query detector of a system for recording sites accessed by a client in a communications network according to the present invention;

Figure 2 is a schematic diagram of inter-related components of a system for recording sites accessed by a client in a communications network according to the present invention;

Figure 3 is a schematic diagram of a search query detector forming part of the system of Figure 2;

Figure 4 is a search trail recorder forming part of the system of Figure 2;

Figure 5 is schematic diagram of an adapter manager forming part of the system of Figure 2; and

Figure 6 is a schematic diagram of a trail searcher forming part of the system of Figure 2.

Referring now to Figures 1 and 2, the system for recording sites accessed by a client in a communications network according to one embodiment of the present invention includes the following four major components: a search query detector 10, search trail recorder 11, adapter manager 12 and trail searcher 13. The trail watcher 10 is a client-side computer program that detects submission of a search query from a client to one of a plurality of search engines. In the example shown in Figure 1, the trail watcher is embodied as a toolbar 20 operable within an Internet browser installed at a client. By detecting a submission of the search query from a client, the trail watcher captures the start of a search trail and the subsequent web links or search trail steps, a user takes as they browse through various content served to the client looking for information that satisfies their

search query. An individual search trail is recorded for each new search trail that a user enters into a search form. The trail recorder 11 subsequently records a search trail of one or more parameters of sites accessed consecutively following return of search query results to the client in the browser window 21.

The search query detector 10 is adapted to capture web browser events such as a DocumentComplete. The DocumentComplete event occurs whenever the browser has finished loading and displaying a new web page. By the time the DocumentComplete event occurs the browser has created an internal predate structure based on the Document Object Model (DOM) to store the page. Client-side scripting language such as Javascript are able to manipulate this data structure inside the memory of the browser, which in turn manipulates the corresponding elements of the web page, such as the forms and images displayed. The search query detector 10 in this example is embodied as a Javascript program that forms a toolbar within an Internet browser, and has full access to the Document Object Model of a web page. When a search user 14 clicks on a link displayed in the Internet browser window 21 and requests the serving of content from the Internet, a new web page is loaded.

Once the content has been served to the client, a DocumentComplete event occurs, which is captured at step 30, as shown in Figure 3. For every form object found in the web page, the search query detector 10 includes a routine to enable interception of the completed form object upon submission of the search query by the search user 14. In this embodiment, the search query detector 14 adds an onSubmit event handler to every form object inside the Document Object Model of the web page served to the client. The onSubmit handler acts to catch an onSubmit event for all forms of the document if, and when, the event occurs. The onSubmit event occurs whenever a user submits the contents of a web form to a remote server. By catching the event, the search query detector intercepts the submission of a form and ensures that the new onSubmit handler is executed before any of the forms in the document are submitted to a third party web server. For example, if a user is using the Google® search engine, the search query detector intercepts whenever a user submits a search form. Before search variables are submitted to the Google® server, they are firstly submitted to the

search trail recorder 11 so that the start of a new search trail can be recorded. The insertion of the onSubmit handler occurs at step 31 in Figure 3, whilst the updating of the Document Object Model occurs in step 32.

An example of the HTML source code of a simple search box is shown in Table 1;

```
<html>
<head>
</head>
<body>
<form name      =    "searchform"
      method   =    "POST"
      action   =    http://turbo10.com/x/search.cgi>
Search <input type = "text" size = "20" name = "query">
<input type = "submit" value = "Search">
</form>
</body>
</html>
```

Table 1

The HTML source code includes an attribute, namely the Uniform Resource Locator (URL) of a server-side script that processes a search request. The HTML source code also includes a method attribute that determines how the parameters are to be passed to the server. The two request methods to submit HTML form data to a server are the "GET" and "POST" methods. The onSubmit handler inserted into every form object of a web page served to a client ensures that all completed search forms are intercepted, at step 33. At step 34, the action attribute of the search form is transmitted to the trail recorder 11 in order to determine whether the action attribute corresponds to an action attribute of a known search engine. The search query detector 10 is advantageously able to intercept both GET and POST form submissions. By transmitting only the action attribute of a search form submission, the search query detector 10 also ensures that no private form data is transmitted unsecurely to the server-side trail recorder 11 that may compromise the privacy of a user, such as a logging form containing user name and password, credit card details or the like. The value of the action

attribute is the URL or network address of the search engine program for executing the search query. For example, the value of the action attribute in the example of HTLM source code shown in Table 1 is http://turbo10.com/x/search.cgi. The onSubmit handler inserted into the form object at step 31 passes the action attribute in a separate HTTP GET request to the trail recorder 11 at step 35. Referring now to Figure 4, the trail recorder 11, upon receipt of the HTTP GET request from the search query detector 10 strips off any parameter portion of the network address or URL of the search engine program for executing the search query so that only the scheme, host name and path remain. To maintain the privacy of the user, no form parameters are submitted to the trail recorder 11 at this time. Only the value of the action attribute is sent to the server. For example, this stripped down version of the search engine URL in the example shown in Table 1 is http://turbo10.com/x/search.cgi.

Using this portion of the URL, the trail recorder 11 searches a table 40 of "Search Engine Adapters" for an action attribute that matches the action attribute value transmitted from the search query detector 10. If the adapter URL does match, then the search query detector 10 determines that the search query submitted by the user is the beginning of a new search trail. More generally, upon detection of submission of a completed form object from the client, the search query detector 10 and search trail recorder 11 determine if part of the form object matches a known search command format of any of a plurality of search engines maintained in a database of known search engine search command formats.

The matching process undertaken by the search trail recorder 11 is important to determine whether or not the form submitted from the client was a search form or another type of form submission, such as a contact us form, login form, etc. The matching process is also important in order to determine the particular search engine intended to execute the search, as well as the search query parameters used by that search engine. The adapter table 40 of known search command formats for the various search engines known to the search trail recorder is used to identify which of the search query parameters are defaults, and which are entered by the searcher. For example, following on from the example shown in Table 1, a search HTTP GET request for a search engine URL

may be http://turbo10.com/x/search.cgi?q=cars&fmt=html. Two potential search query parameters arise from this request, namely "q" and "fmt". One is entered by the user in the search form, whilst the other is a default value. The adapter table 40 stores which parameter corresponds to the search query entered by the user. In this case, the search query parameter stored in the adapter table 40 is "q" so the search trail recorder 11 is able to determine that this is the beginning of a search trail for "cars" and not "html". The adapter definition stored in the adapter table 40 is able therefore to distinguish between form parameters entered by the searcher and default values, such as session identifiers, user identifiers or other hidden variables. More generally, the search command format maintained by the adapter table 40 includes not only the network address of a search engine program for executing the search query, but additionally one or more search parameters identifying a user-entered search query.

If a corresponding action attribute constituting part of the form object submitted by the client is found to match a stored action attribute in the adapter table 40, then the search trail recorder 11 determines that the form about to be submitted is a search form. When a search form is found at step 41 by the search trail recorder, an adapter identifier is transmitted, at step 42, to the search query detector 10 to indicate that the submission of a known search form query has been detected. The adapter identifier returned to the search query detector 10 is maintained in a current adapter identifier table 35.

When an adapter identifier is returned to the search query detector 10, a button 22 on the toolbar 20 displays a recording symbol to indicate to the user that a search trail is about to be recorded. If no search form was found, and no adapter identifier returned, then the recording icon is not displayed. The search user 14 is able to click on the trail recorder button 22 in order to turn the recording button on or off and therefore selectively activate the search trail recording feature of the search trail recorder. The toggling on or off of the search trail recorder is carried out at step 37 of Figure 3, which has the effect of changing the state of the search trail recorder status data 38 maintained by the search query detector 10. At step 39, the search query detector 10 determines whether the state of the search trail recorder status data 38 indicates that recording should occur, and that

a known adapter identifier was returned by the trail recorder 11, the search query detector 10 initiates the recording of the network address of the consecutively accessed sites in the search trail following return of the search query results to the client.

Accordingly, when the search trail recorder function is turned "on", for every DocumentComplete event that is detected at step 30, a separate HTTP GET request is sent by the search query detector 10 to the search trail recorder 11 at step 40 to record a step in the search trail. The parameters sent in the GET request include a unique user identifier, the URL of the current page, the referring URL, the title of the page, the network address of the client, the adapter identifier of the search engine, and the search term or terms used by the user. A server Common Gateway Interface (CGI) program receives these parameters at step 43 and stores them in a RAM based database table 44 maintained by a remote server. A RAM based database table provides the advantage of enabling the rapid insertion and storage of parameters describing every step in the search trail.

Periodically, the RAM based database table 44 is emptied into one of two disk-based tables 45 and 46 by an emptying routine 47 maintained by the search trail recorder 11. The first disk-based table 45 stores data characterising each search trail, whereas the second disk-based table stores data characterising the consecutive sites accessed in each search trail. A new trail is created whenever the adapter identifier located in step 41 is not null (i.e. a user has entered a search query and a search form for a search engine known to the search trail recorder 11). Subsequent entries in the RAM based database table 44 then form steps in the search trail that the user has followed.

For each unique user, each subsequent step in the search trail is entered sequentially in the database table 44. Sometimes a searcher may wander off a search trail or otherwise be distracted. In this case, the database table 44 will record URLs that do not relate to the search term or terms originally entered by the user. To assist in not recording too many irrelevant trail steps, the search trail recorder 11 may limit the length of a search trail to a maximum number of steps or a predetermined maximum elapsed time between the start of the search trail and the current search trail step.

An example of the types of data maintained in the RAM based table 44 and disk-based tables 45 and 46 is set out below. The TrailBucket table 44 stores data temporarily in RAM without accessing the disk drive for speed and scalability. Table 2 illustrates one example of data stored in the table 44.

TrailBucket	
userid	A unique numerical userid
url	The URL last visited by the user
referrer	The URL that referred the searcher to the current URL
title	The title of the page
context	A short context of where the search terms are found on the page
ipaddress	The Internet Protocol address of the client machine
adapterid	The unique identifier of the search engine where the trail was started
searchterm	The search term entered that started the trail
visitedon	The date and time the page/form is visited

Table 2

The trail table 45 stores the search term that commenced the trail and the source engine (i.e., adapterid), as shown in Table 3.

Trail	
trailid	A unique number identifying the trail
searchterm	The URL last visited by the user
adapterid	The URL that referred the searcher to the current URL
ipaddress	The IP address of the machine used
userid	The title of the page
createdonday	A short context of where the search terms are found on the page
visitcount	The total number of times steps in the trail has been visited

Table 3

The TrailStep table 46 records details about the URL visited as shown in Table 4.

TrailStep	
stepid	A unique number identifying a step in the trail
title	The page Title of the URL
url	The URL of the page in the step
sequence	The order in the trail of the step
context	A short snippet of text showing the keyword in context on the target page
adapterid	The URL that referred the searcher to the current URL
clickedon	The date and time that the step was clicked on
visitcount	The number of times this step has been visited
createdonday	A short context of where the search terms are found on the page
weight	The cumulative number of visits to this trail step. The total of all steps is the trail visit count
trailid	Foreign key. Uniquely identifies the Trail this TrailStep belongs too

Table 4

The adapter table 40 stores details of the search form parameters that drive the underlying search engine, as shown in Table 5.

Adapter	
adapterid	A unique number identifying a step in the trail
shorttitle	A short title for the adapter (e.g., google)
title	The title of the search engine that the adapter connects to (e.g., Google Search Engine)
url	The URL of the search engine (e.g., http://www.google.com)

searchboxurl	The URL of the page the searchbox appears on (e.g., http://www.googe.com)
status	The current status of the adapter (e.g., Alive, Dead, Broken, Buried)
timetolive	The number of days a broken adapter has to live before the status is changed to dead (e.g., 4)
formmethod	The HTTP submission method of the search form (e.g., GET or POST)
action	The value of the form action attribute (e.g., http://www.google.com/search)
queryparameter	The value of the query parameter that the user enters to use the engine (e.g., q)
testquery	An example test query term with which to test the engine (e.g., test)
parameters	Other parameters contained in the search form (e.g., ht)
lastupdatedon	The time the record was last updated

Table 5

As explained previously, the adapter table 40 of known search command formats for the various search engines known to the search trail recorder 11 is managed by the adapter manager 12. The search command formats maintained in the adapter table 40 are periodically validated by the adapter manager 12. The adapter table 40 contains a description which uniquely identifies a search engine's search form. The adapter manager 12 periodically (for example, once a day) tests existing search command formats and connects to new search engines to derive new search command formats. If a search command format is found to be broken, the adapter manager will attempt to repair the broken format. The only information required to adapt to a search engine is the URL of the web page that contains the search box. In this example of the invention, all other information is automatically gathered by the adapter manager 12. Accordingly, when a search form URL is transmitted by a search user 14 to the adapter manager 12, the adapter manager initially determines at step 50 whether an existing adapter identifier is present in the adapter table 40 confirming that the search engine located at that URL is already known. If this is the case, a confirmation is returned

to the search user 14. Otherwise, the search form URL is transmitted to a form finder component that automatically gathers details about the target search engines search form, including the search form submission method (i.e. GET or POST) and the value of the action attribute (i.e. http//google.com.search).

Accordingly, at step 51, the form finder component transmits a request for a search form to an external search engine 52. The search page from the corresponding external search engine 52 is then returned to the form finder component at step 53. The form finder component locates the search form from the Document Object Model of the search page and identifies the parameters required to drive the underlying search engine including the query parameters, form submission method, cookie settings and the search URL, at step 54. This parameter identification step is carried out by requesting the HTML source of the search box form page and parsing the HTML source code with an HTML parser. It is often the case that the first form on the page is the search page. Once a form is found, the first text box in the form is used at step 55 to test the search command format (adapter) with the external search engine 52. A test query is transmitted at step 56, which is then processed by the external search engine 52. A test result page is then received by the adapter manager 12 at step 57 when the test query was submitted in the correct search command format. If the result page is found for the test term, the adapter status is set to "live" in the adapter table 40.

The trail searcher 13 enables a searcher to search for their own trails or the trails created by others that match a given search query. Upon receipt of a search query from a search user 14, the trail searcher 13 at step 60, acts to match a search query against previous search queries stored in the trail table 45 to identify related search trails. A full text index on the search term field is carried out to enable the matching to be performed after removing stop words and calculating an Inverse Document Frequency (IDF) value for each match. The trail searcher 13 is adapted to enable a user to limit the search to only their own trails, or optionally to broaden the search to include the search trails of others. At step 61, the order in which the related search results are to be presented to the search user is determined by one or more ranking criteria. The order in which the trail search results are presented may be determined by date, Inverse Document Frequency

match, target search engine, user identifier and/or trail weight. A combination of any one or more of these ranking criteria may be selected by the user. In other embodiments, trails may be presented based upon the network address of the client and/or geographic proximity to the user who first traversed the trail.

The trail weight is incremented each time a step on the trail is visited by a user. A trail's weight is the cumulative weight of all steps in the trails and is initially zero. Whenever a trail step is displayed and the user clicks on a step, a server-side CGI program increments the total weight of the trail step by one (for example, http://turbo10.com/cgi-bin/addweight.cgi?stepid=2132213). Steps 12 that are clicked on more often acquire more weight. A trail's weight is the sum of all weights of its trail steps. The order of trails in the results step can be displayed in order of decreasing weight with the more traversed trails appearing first. In other embodiments, a trail's weight may gradually decrease over time, to that newer trails can become popular by appearing in the results set earlier. A user may also choose to view other trails that the user has traversed. Accordingly, the ordered search trail results are presented to the user, after formatting at step 62. Any adjustment to the trail weight made at step 63 has the effect of applying a weighting to the steps of the search trail maintained in the trail step table 46, which is then taken into account in the sorting of the related search results at step 61.

It will be understood that the above described client-side and server-side functions carried out by the search query detector 10, search trail recorder 11, adapter manager 12 and trail searcher 13 are carried out by computer programs comprising a series of instructions for causing a programmable apparatus or device to perform desired functionality. In the above described embodiment, the search query detector is embodied by a computer program installed in a client, whereas the trail record 11, adapter manager 12 and trail searcher 13 are computer programs or computer program components maintained at a remote server. In other embodiments of the invention, the trail recorder 11, adapter manager 12 and trail searcher 13 need not necessarily be hosted on a same physical server. Similarly, the adapter table 40, trail table 45, trail step table 46, trail bucket 44 and other tables and databases required for carrying out the above

described functionality may be located on the same or a different server from the computer program or programs accessing those databases or tables.

Finally, it is to be understood that various modifications and/or additions may be made to the invention without departing from the spirit or ambit as defined in the claims appended hereto.

The claims defining the invention are as follows:

1. An automated method for recording sites accessed by a client in a communications network, the method including the steps of:

detecting submission of a search query from the client to one of a plurality of search engines; and

recording a search trail of one or more parameters of sites accessed consecutively following return of search query results to the client.

2. An automated method according to claim 1, wherein the step of detecting submission of the search query includes:

detecting submission of a completed form object from the client;

determining if part of the form object matches a known search command format of any of the plurality of search engines.

3. An automated method according to claim 2, wherein the search command format includes the network address of a search engine program for executing the search query.

4. An automated method according to claim 3, wherein the search command format further includes one or more search parameters identifying a user-entered search query.

5. An automated method according to any one of claims 2 to 4, wherein the step of detecting submission of a completed form object by the client includes:

locating form objects in an object model of content served to a client; and

adding a routine to each form object to enable interception of the completed form object upon submission.

6. An automated method according to claim 5, wherein the step of locating all form objects in a document object model of content served to a client is carried out after the content has been served to the client.

7. An automated method according to claim 6, wherein the content is an HTML document, and all form objects in a document object model of the HTML document are located once a DocumentComplete event occurs.

8. An automated method according to claim 7, wherein the HMTL document includes a GET or a POST form.

9. An automated method according to any one of the preceding claims, wherein the step of recording one or more parameters of the sites accessed consecutively from the search query results is optionally selectable at the client once a search query is detected.

10. An automated method according to any one of the preceding claims, wherein the step of recording one or more parameters of the sites accessed consecutively from the search query results includes:

recording the network address of the consecutively accessed sites.

11. An automated method according to claim 10, wherein the step of recording one or more parameters of the sites accessed consecutively from the search query results further includes:

recording one or more of a user identifier, the network address of a referring site, the network address of the client and search term or terms entered by the user at the client.

12. An automated method according to either one of claims 10 or 11, wherein the step of recording one or more parameters of the sites accessed consecutively from the search query results further includes:

transmitting the one or more parameters identified at the client to a trail recorder server for recordal.

13. An automated method according to claim 12, and further including:

initially recording the one or more parameters in a RAM table at the trail recorder server.

14. An automated method according to claim 13, and further including:

periodically saving RAM table data to disk-based tables at the trail recorder server.

15. An automated method according to claim 14, wherein a first disk-based table stores data characterising each search trail.

16. An automated method according to either one of claims 14 or 15, wherein a second disk-based table stores data characterising the consecutive sites accessed in each search trail.

17. An automated method according any one of the preceding claims, wherein the number of consecutively accessed sites is limited to a predetermined maximum.

18. An automated method according to any one of the preceding claims, and further including:

maintaining an adapter table of known search command formats for the plurality of search engines.

19. An automated method according to claim 18, and further including:

periodically validating the search command formats maintained in the adapter table.

20. An automated method according to either one of claims 18 or 19, and further including:

automatically identifying a search command format of a new search engine; and

updating the adapter table.

21. An automated method according to any one of claims 18 to 20, and further including:

collecting search information identifying a search box page of a search engine; and

identifying the search command format from the search information.

22. An automated method according to claim 21, wherein the step of collecting search information includes:

collecting the HTML code of the search box; and

parsing the HTML code to identify the search command format.

23. An automated method according to any one of claims 9 to 17, and further including:

matching the search query to previous search queries to identify related search trails.

24. An automated method according to claims 23, wherein the step of matching the search query to previous search queries includes:

conducting a full text search on the search query and previous search queries.

25. An automated method according to either one of claims 23 or 24, wherein the step of matching the search query to previous search queries includes:

limiting the related search trails to search trails resulting from search queries from a same user.

26. An automated method according to either one of claims 23 or 24, wherein the related search trails include search trails resulting from search queries from a same user and other users.

27 An automated method according to any one of claims 23 to 26, and further including:

presenting the related search trails at the client.

28. An automated method according to claim 27, wherein the step of presenting the related search trails includes:

ordering the related search results by one or more ranking criteria.

29. An automated method according to claim 28, wherein the ranking criteria include any one or more of date, inverse document frequency match, target search engine, user identifier, or trail weight indicative of the cumulative frequency of user visits to steps in a related search trail.

30. A system for recording sites accessed by a client in a communications network, the system including:

a search query detector for detecting submission of a search query from the client to one of a plurality of search engines; and

a search trail recorder for recording a search trail of one or more parameters of sites accessed consecutively following return of search query results to the client.

31. A system according to claim 30, and further include:

an adapter manager for maintaining an adapter table of known search command formats for the plurality of search engines.

32. A system according to either one of claims 30 or 31, and further including:

a trail searcher for matching the search query to previous search queries to identify related search trails.

33. A search query detector for use with a system according to any one of claims 30 to 32.

34. A search trail recorder for use with a system according to any one of claims 30 to 32.

35. An adapter manger for use with a system according to claim 31.

36. A trail searcher for use with a system according to claim 32.

37. Computer software including program instructions for carrying out the method performed by the search query detector, search trail recorder, adapter manager and/or trail searcher according to any one of claims 30 to 36.

NIGEL HAMILTON
By his Registered Patent Attorneys
Freehills Carter Smith Beadle

19 January 2004

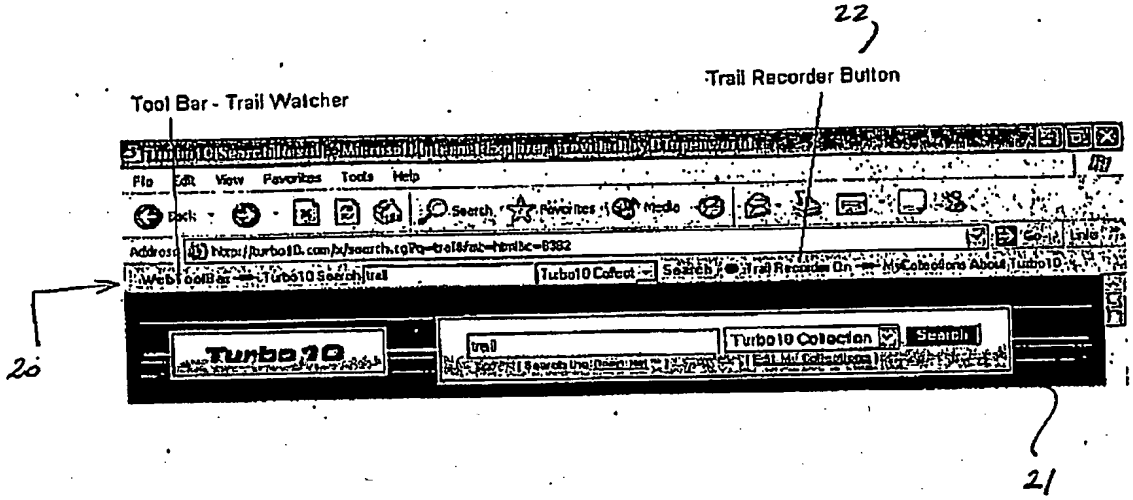
22
Trail Recorder Button
Tool Bar - Trail Watcher
20
21
Turbo10
trail
Turbo10 Collection
Search

Figure 1

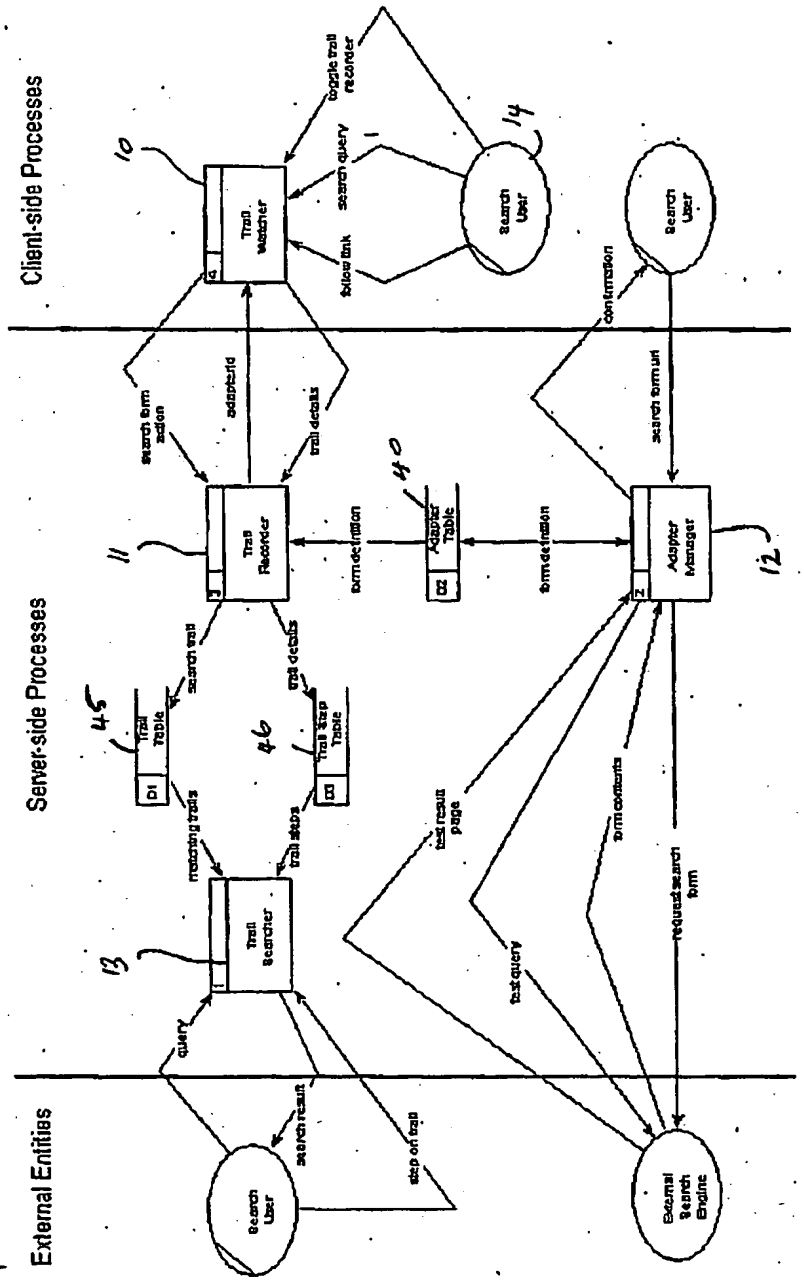
Client-side Processes
Server-side Processes
External Entities
Trail Watcher
Search User
toggle trail recorder
search query
follow link
search form action
adapterId
trail details
Trail Recorder
Adapter Table
form definition
Adapter Manager
search form url
confirmation
search trail
trail steps
Trail Table
Trail Step Table
matching trails
query
search result
step on trail
test result page
test query
form contents
request search form
External Search Engine

Figure 2.

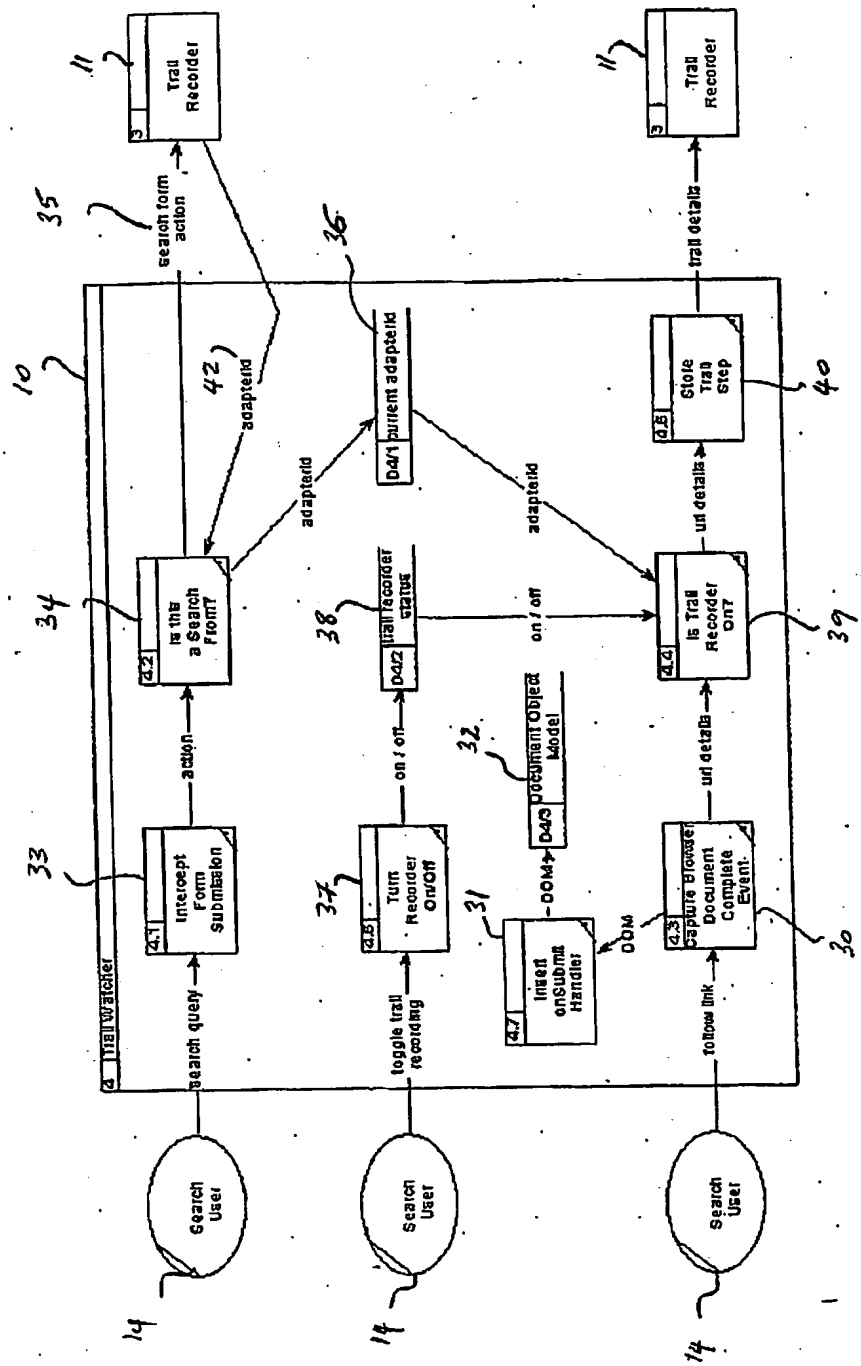
Trail Recorder
search form action
trail details
adapterId
adapterId
adapterId
Current adapterId
Close Trail Step
Is this a Search Form?
Trail Recorder status
Is Trail Recorder On?
url details
on / off
action
on / off
Document Object Model
DOM
DOM
url details
Intercept Form Submission
Turn Recorder On/Off
Insert onSubmit Handler
Capture Browser Document Complete Event
Trail Watcher
search query
toggle trail recording
follow link
Search User
Search User
Search User

Figure 3

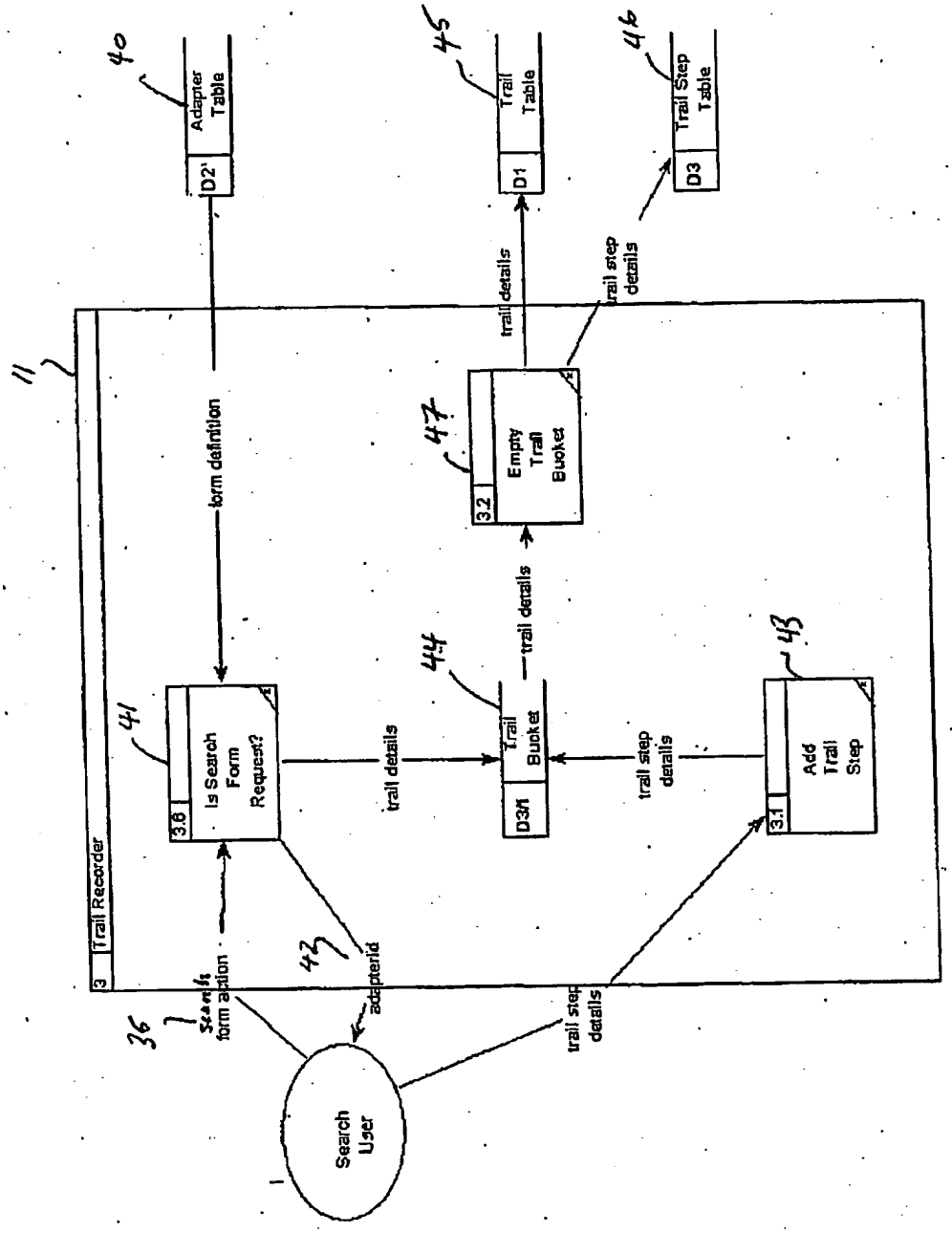
3 Trail Recorder
3.6 Is Search Form Request?
3.1 Add Trail Step
3.2 Empty Trail Bucket
D1 Trail Table
D2' Adapter Table
D3 Trail Step Table
D3/1 Trail Bucket
form definition
trail details
trail step details
adapterid
search form action
Search User
36
40
41
42
43
44
45
46
47
11

Figure 4

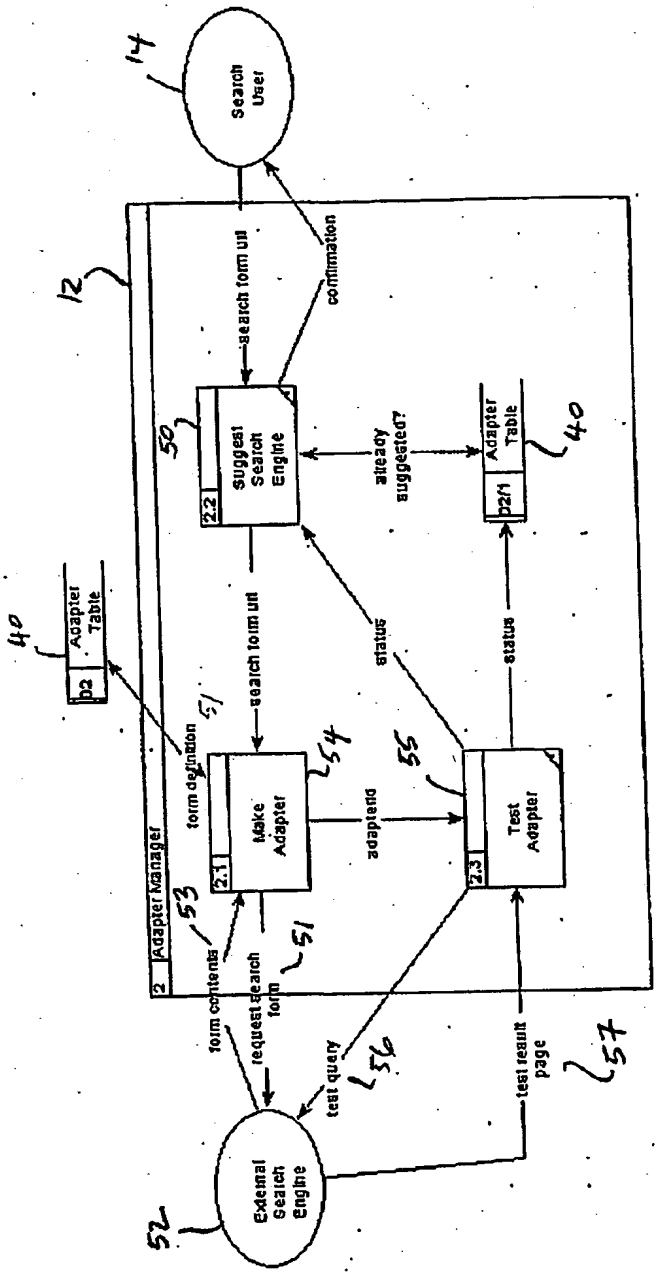
14
Search User
12
search form url
confirmation
50
2.2
Suggest Search Engine
already suggested?
Adapter Table
p2/1
40
40
Adapter Table
p2
search form url
status
status
51
54
55
2 Adapter Manager
form definition
2.1
Make Adapter
adapterd
2.3
Test Adapter
53
form contents
request search form
51
test query
56
test result page
57
52
External Search Engine

Figure 5

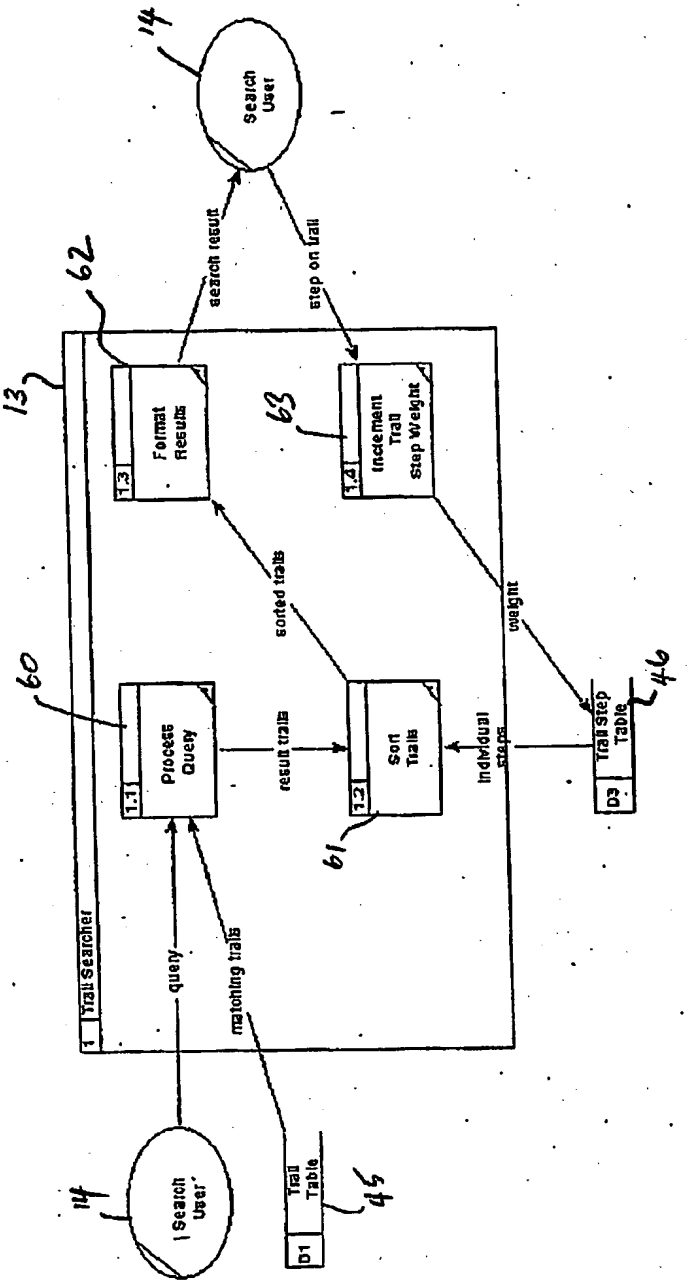
14
Search User
search result
step on trail
62
13
Format Results
1.3
63
Increment Trail Step Weight
1.4
sorted trails
weight
60
Process Query
1.1
result trails
Sort Trails
1.2
61
Individual steps
Trail Step Table
D3
46
1 Trail Searcher
query
matching trails
14
Search User
Trail Table
D1
45

Figure 6

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

To:

FREEHILLS PATENT & TRADE MARK ATTORNEYS
Level 43
101 Collins Street
Melbourne, Victoria 3000
AUSTRALIE

Date of mailing *(day/month/year)* 02 February 2005 (02.02.2005)	
Applicant's or agent's file reference 80773162RNM	**IMPORTANT NOTIFICATION**
International application No. PCT/AU04/001763	International filing date *(day/month/year)* 15 December 2004 (15.12.2004)
International publication date *(day/month/year)*	Priority date *(day/month/year)* 19 January 2004 (19.01.2004)
Applicant HAMILTON, Nigel	

1. By means of this Form, which replaces any previously issued notification concerning submission or transmittal of priority documents, the applicant is hereby notified of the date of receipt by the International Bureau of the priority document(s) relating to all earlier application(s) whose priority is claimed. Unless otherwise indicated by the letters "NR", in the right-hand column or by an asterisk appearing next to a date of receipt, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).

2. *(If applicable)* The **letters "NR"** appearing in the right-hand column denote **a priority document which, on the date of mailing of this Form, had not yet been received by the International Bureau** under Rule 17.1(a) or (b). Where, under Rule 17.1(a), the priority document must be submitted by the applicant to the receiving Office or the International Bureau, but the applicant fails to submit the priority document within the applicable time limit under that Rule, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

3. *(If applicable)* **An asterisk (*)** appearing next to a date of receipt, in the right-hand column, denotes **a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b)** (the priority document was received after the time limit prescribed in Rule 17.1(a) or the request to prepare and transmit the priority document was submitted to the receiving Office after the applicable time limit under Rule 17.1(b)). Even though the priority document was not furnished in compliance with Rule 17.1(a) or (b), the International Bureau will nevertheless transmit a copy of the document to the designated Offices, for their consideration. In case such a copy is not accepted by the designated Office as the priority document, Rule 17.1(c) provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

Priority date	Priority application No.	Country or regional Office or PCT receiving Office	Date of receipt of priority document
19 January 2004 (19.01.2004)	2004900248	AU	11 January 2005 (11.01.2005)

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